

科目：材料力學 適用：土木所結構組 地震所

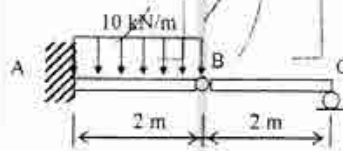
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考生注意：

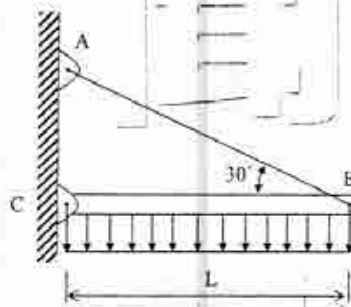
1. 依次序作答，只要標明題號，不必抄題。
2. 答案必須寫在答案卷上，否則不予計分。
3. 限用藍、黑色筆作答；試題須隨卷繳回。

本試題
共壹頁
第 2 頁

1. Derive the formula for shear stress $\tau = \frac{VQ}{Ib}$ (25%)
2. The prismatic beam as shown has a rectangular cross section. The width and depth of the cross section are 30 cm and 60 cm, respectively.
 - a) Plot the shear force diagram and bending moment diagram (5%)
 - b) Determine the maximum normal stress and the maximum shear stress (5%)
 - c) Plot the stress element and the Mohr's circle representing the stress state at the point where the maximum tensile normal stress occurs. (10%)



3. The pipe is supported by a pin at C and a steel guy wire AB. The cross-sectional area and young's modulus of the wire are A and E, respectively. Determine the distributed load w if the end B is displaced δ downward. (25%)



4. A 6-meter-long simply supported beam is subjected to a concentrated force P at its mid-span. The bi-linear moment-curvature curve of the cross section is given and is shown in the following figure (Fig. 4a). Please compute and plot the bi-linear mid-span force-deflection curve. (30%)

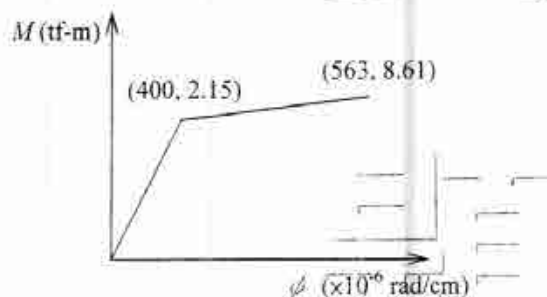


Fig. 4a Moment-curvature curve (given)

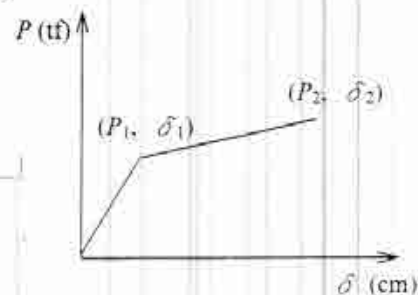


Fig. 4b Force-deflection curve (to be determined)

Note: Location of centroid of

$$\text{a trapezoid } c = \frac{d(2b + b_1)}{3(b + b_1)}$$

